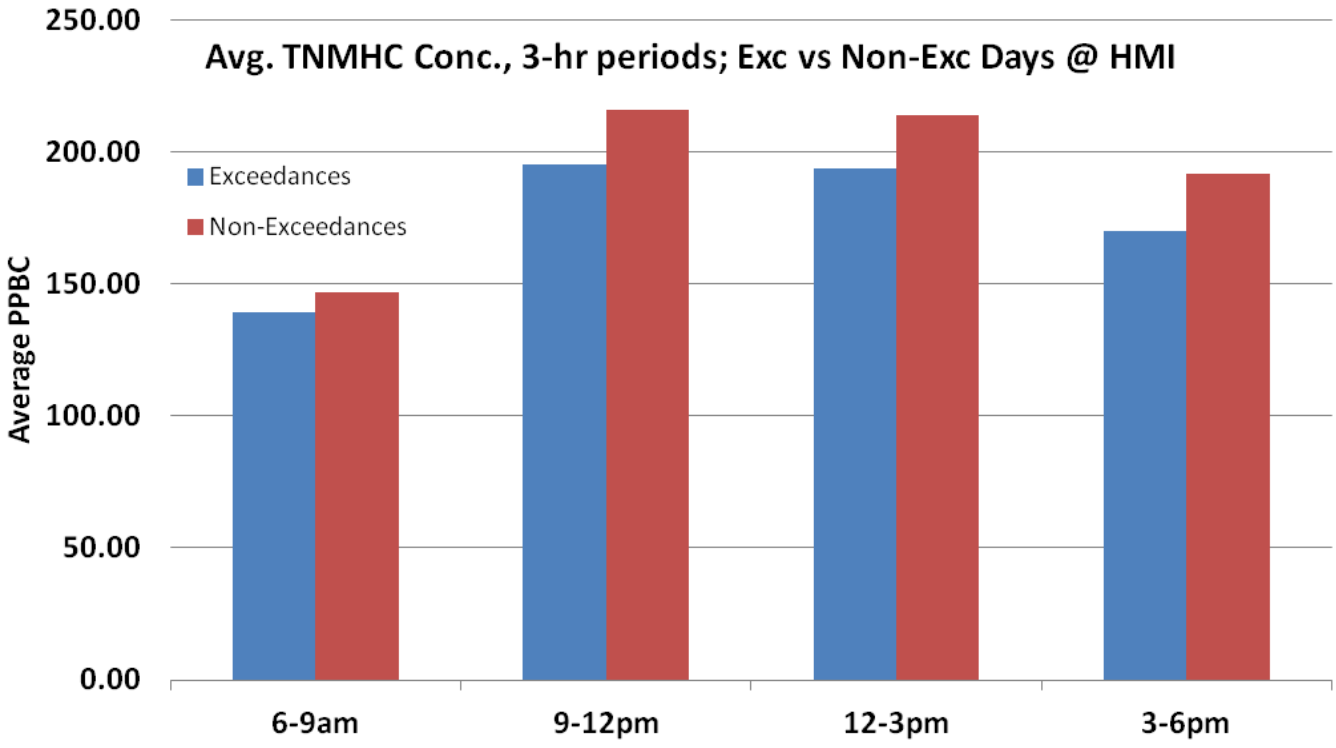
The Maryland Department of the Environment had 34 successful VOC canister samples on HMI during the OWLETS-2 campaign. Sample days are as follows (# of canisters):

June 8 (4); Friday – Non Ex @ HMI
June 17 (4); Sunday – Ex @ HMI
June 18 (4); Monday – Non Ex @ HMI
June 19 (1); Tuesday – Non Ex @ HMI
June 24 (3); Sunday – Non Ex @ HMI
June 29 (4); Friday – Ex @ HMI
June 30 (4); Saturday – Ex @ HMI
July 1 (5); Sunday – Non Ex @ HMI
July 2 (4); Monday – Ex @ HMI
July 5 (1); Thursday – Non Ex @ HMI

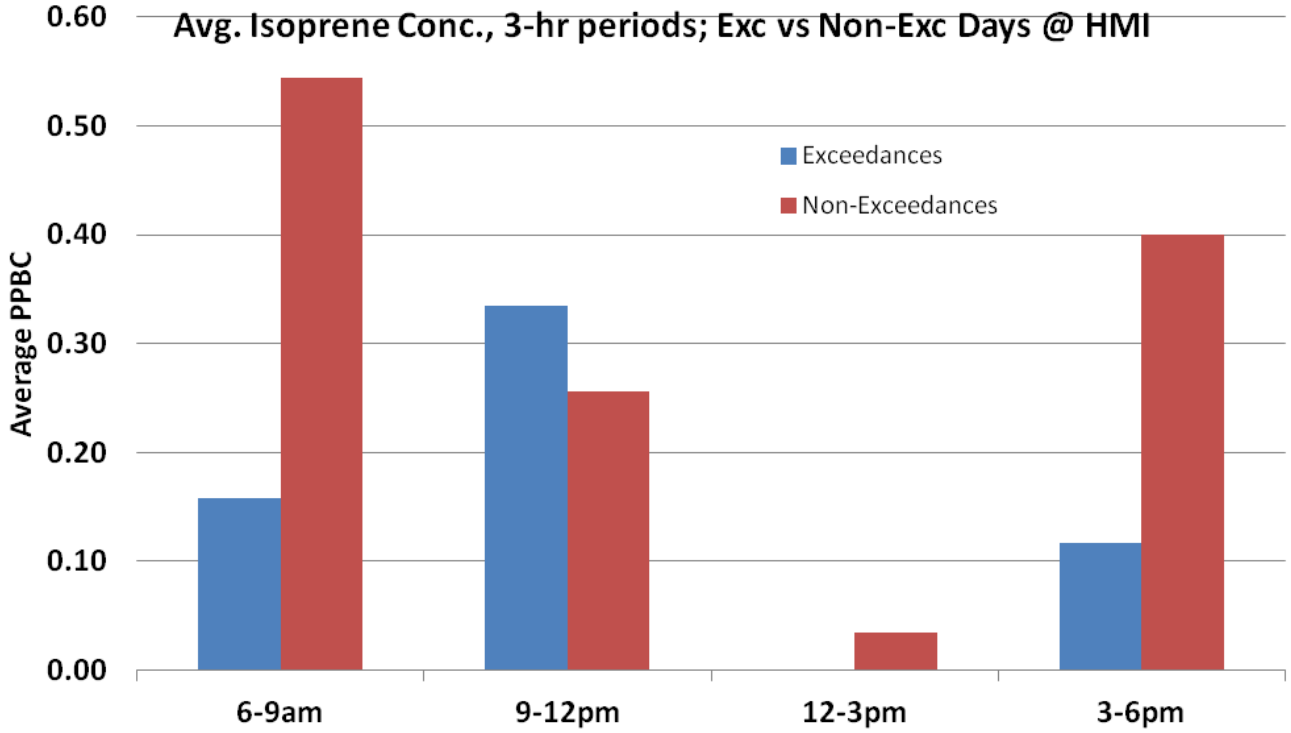
The use of programmable timers made controlled and unattended sampling and durations possible, allowing a collection strategy which covered a 12-hour diurnal profile of VOCs in 3-hour increments of 6am-9am, 9am-12pm, 12pm-3pm, 3pm-6pm local time. There was also a sample from 3am-6am on July 1 to serve as a nocturnal observation of VOCs over the Chesapeake Bay.

There are 59 individual compounds, plus Total Non-Methane Hydro Carbons (TNMHC) and Total PAMS. There are also 37 additional toxics analyzed. A sensitivity issue with the pinenes was discovered and alpha and beta pinenes were voided, which leaves a total of 94 different VOC compounds available for analysis.

There were eight days with a sample of VOCs through daylight hours. Four days were exceedance events at HMI. Four days were non-exceedance events at HMI but two of the four were exceedance events elsewhere in Maryland. For comparison, samples taken on a day with 8-hr ozone at HMI exceeding 70ppb ("Exceedances") were compared with samples taken on days where 8-hour ozone did not exceed 70ppb at HMI ("Non-Exceedances"). TNMHC is shown below. On average, the non-exceedance days had more VOCs present than the exceedance days at HMI.

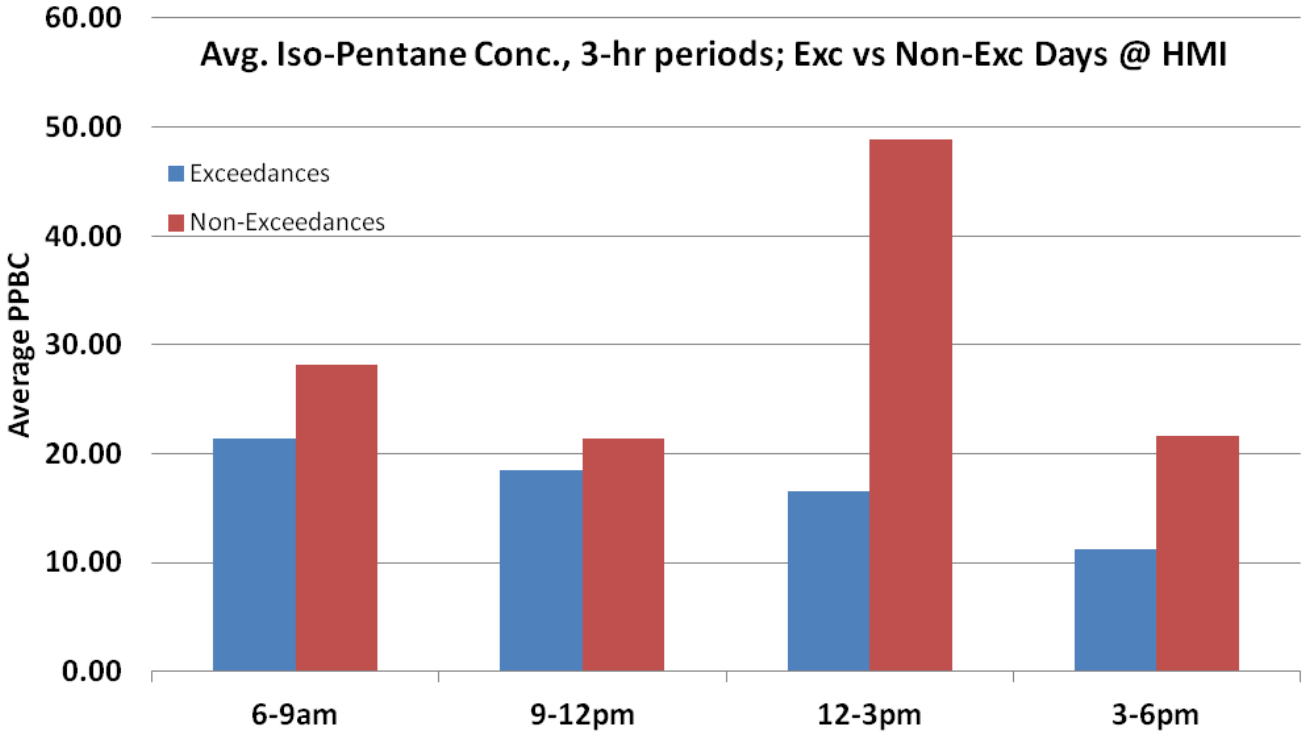


Isoprene is often considered the VOC with highest Maximum Incremental Reactivity (MIR) in Maryland. Average VOC concentrations of Isoprene per 3-hour bins at HMI, are shown below for exceedance and non-exceedance days, split by whether the sample was taken during a day with 8-hour average ozone at HMI greater than 70ppb. No isoprene was ever observed during any exceedance day, 12-3pm.

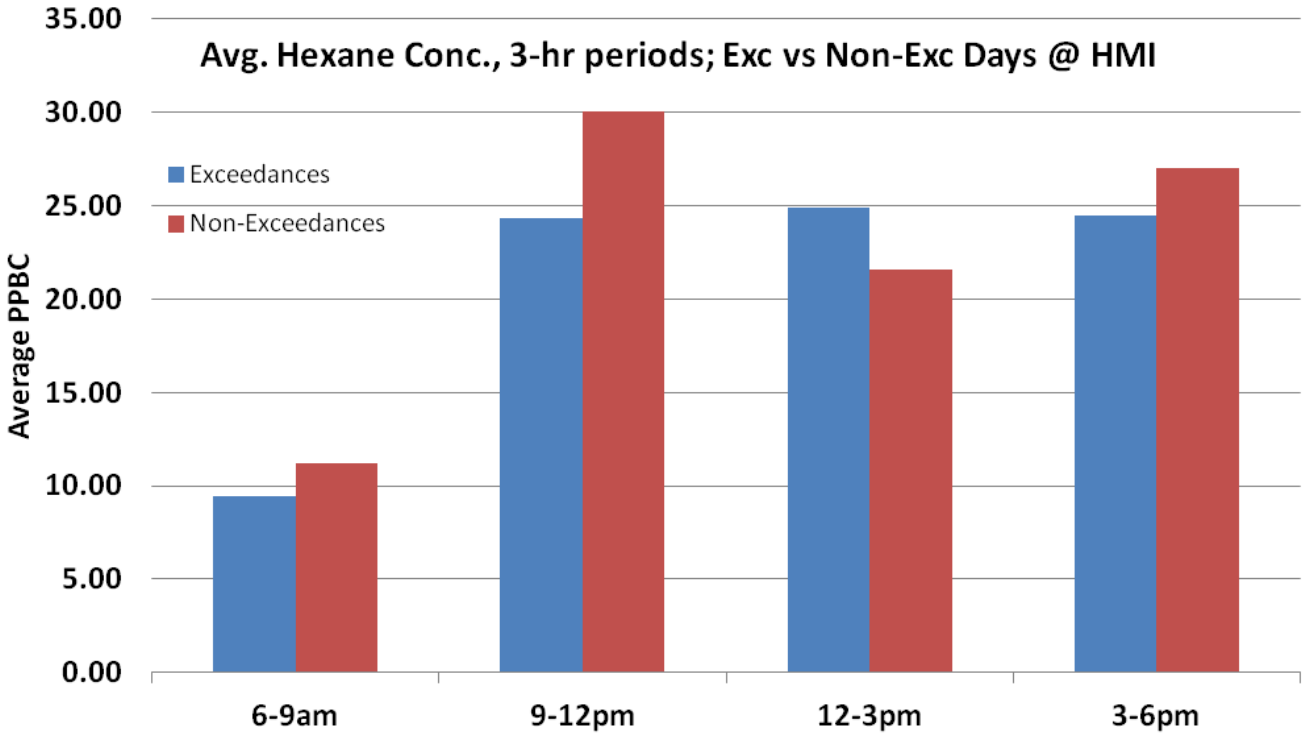


Using the complete data set of all days and canisters, the compounds with the highest standard deviation were Isoptentane (12.10), Hexane (8.16), Cyclohexane (5.56), 3-Methylhexane (4.83), Toluene (4.38), and Pentane (3.15). Three of these compounds are presented below:

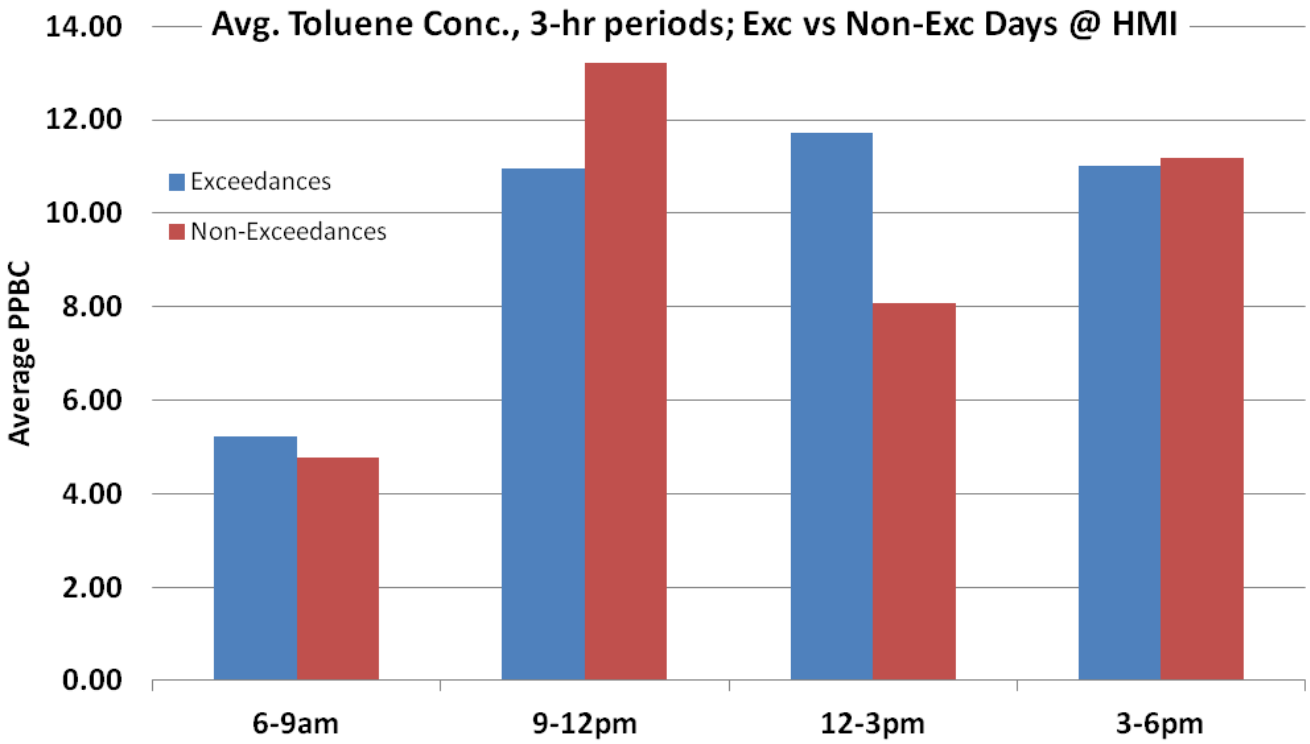
Isopentane



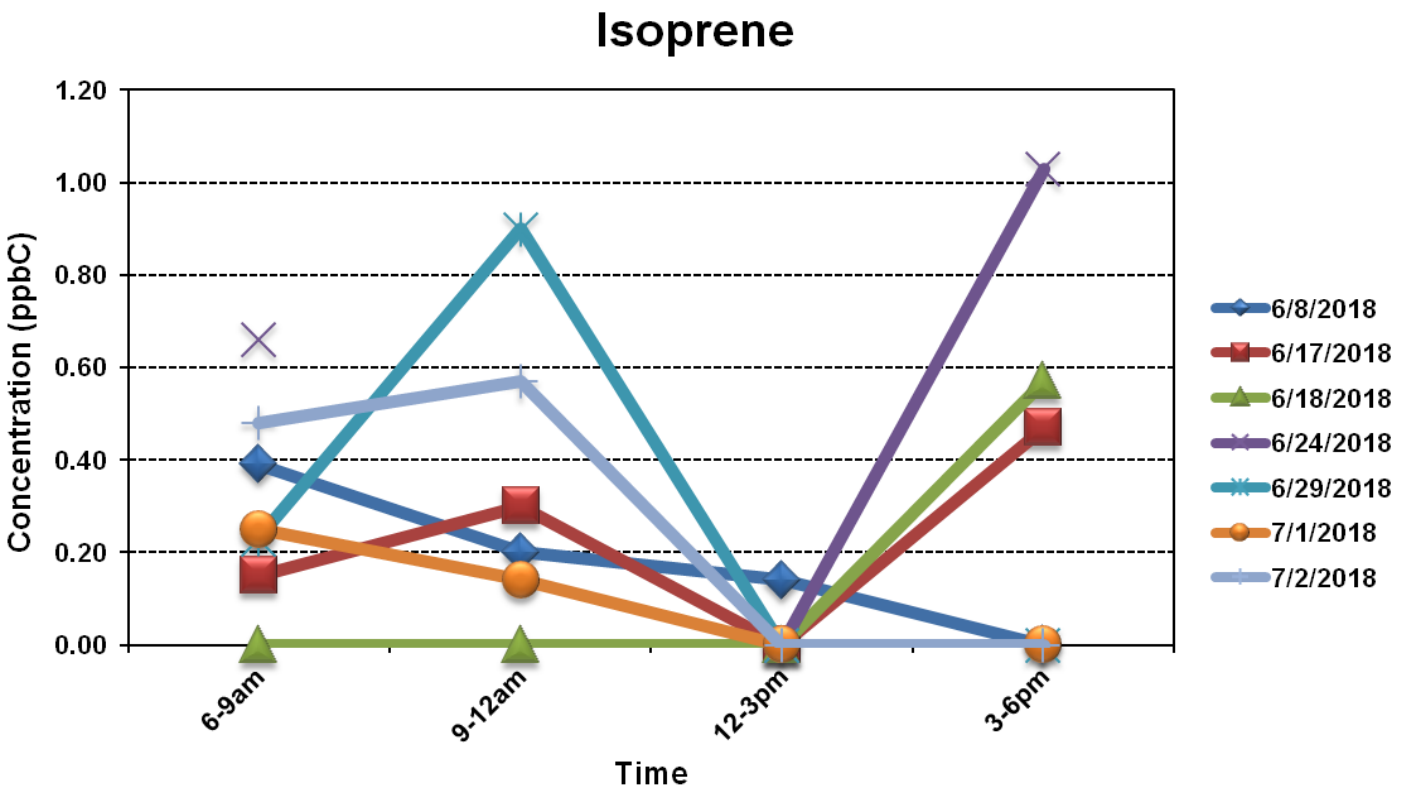
Hexane

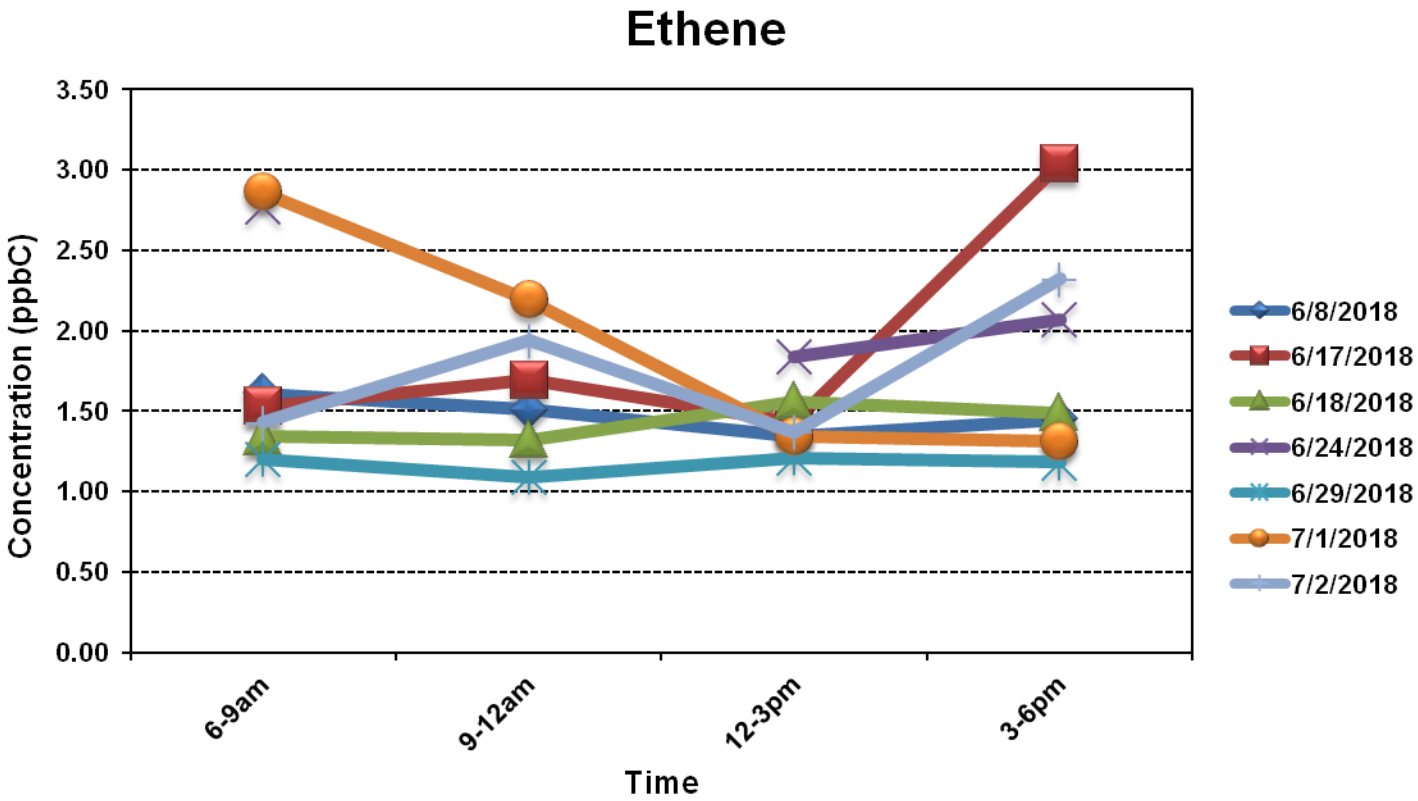


Toluene

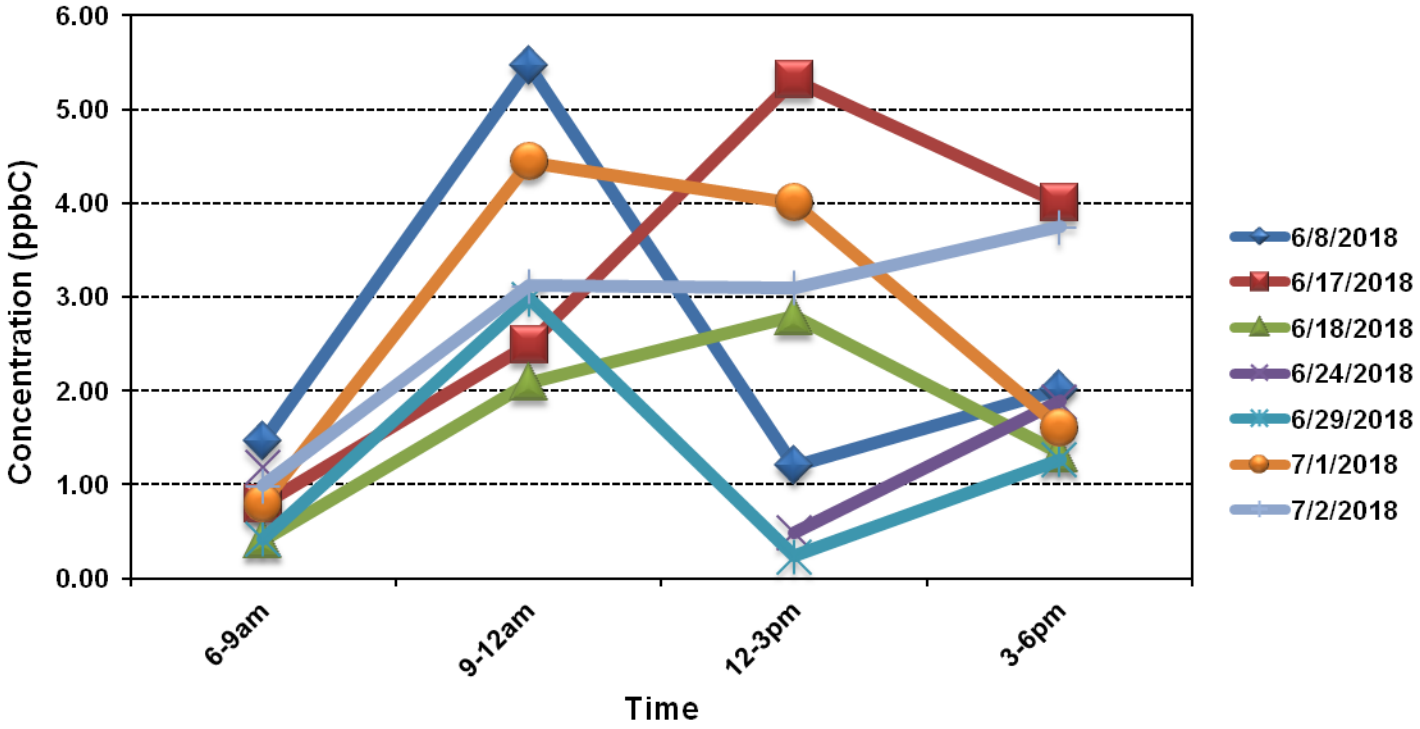


Daily profiles of nine compounds with the highest MIRs in Maryland exceedances are given below.

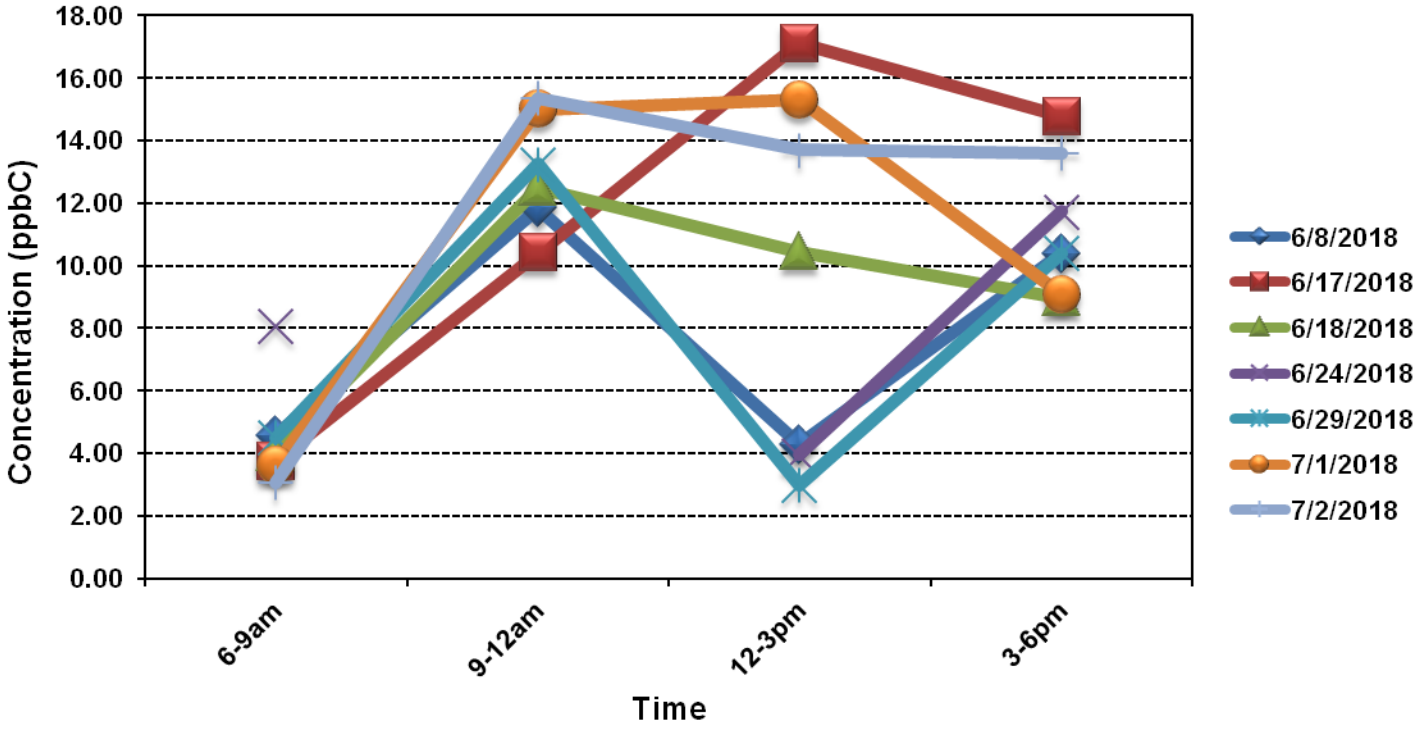




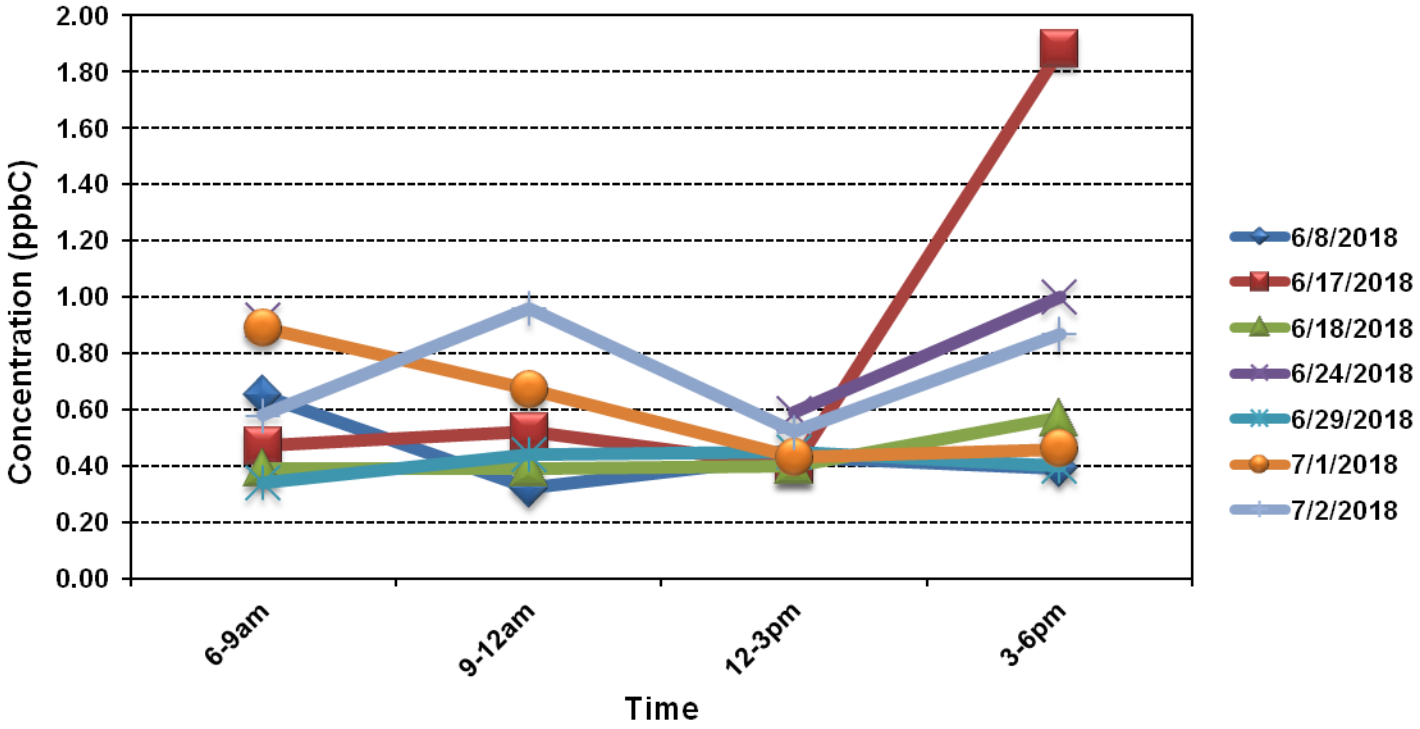
m,p xylene



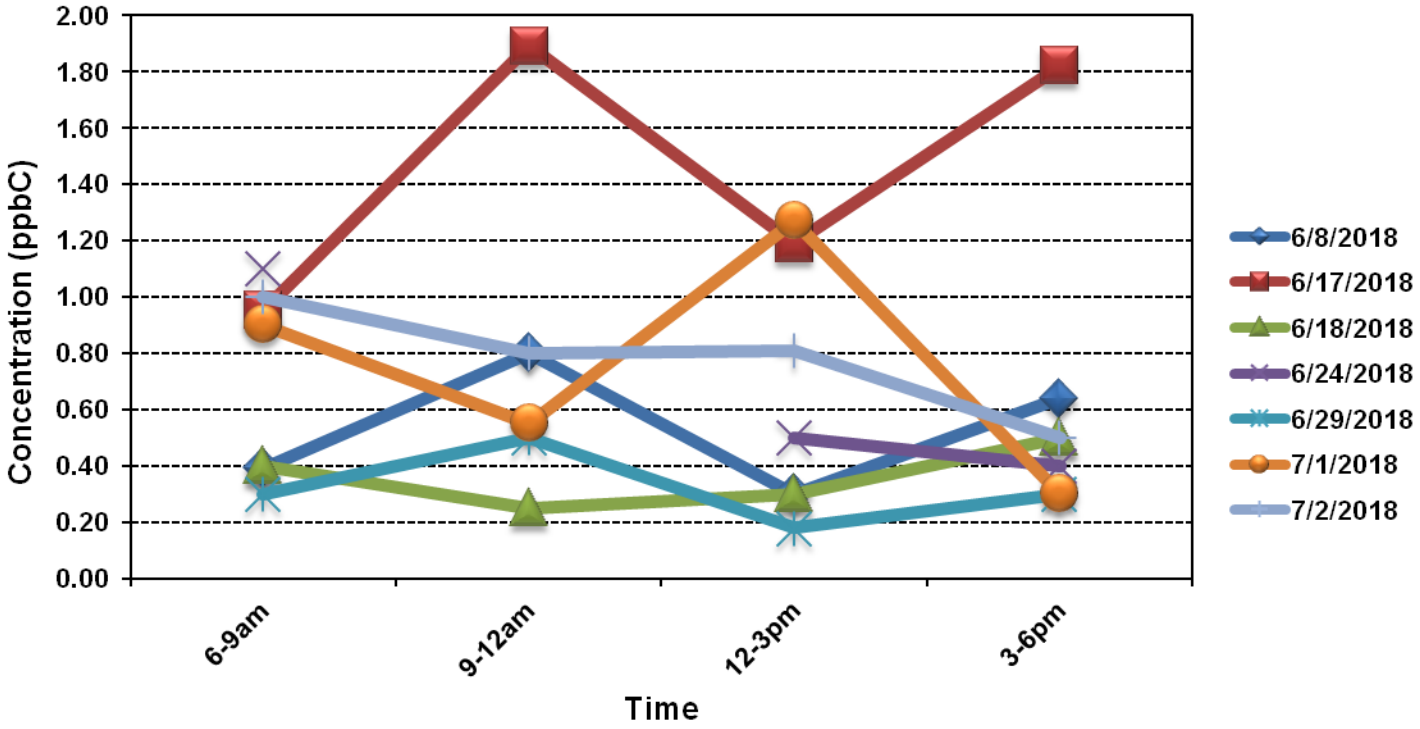
Toluene

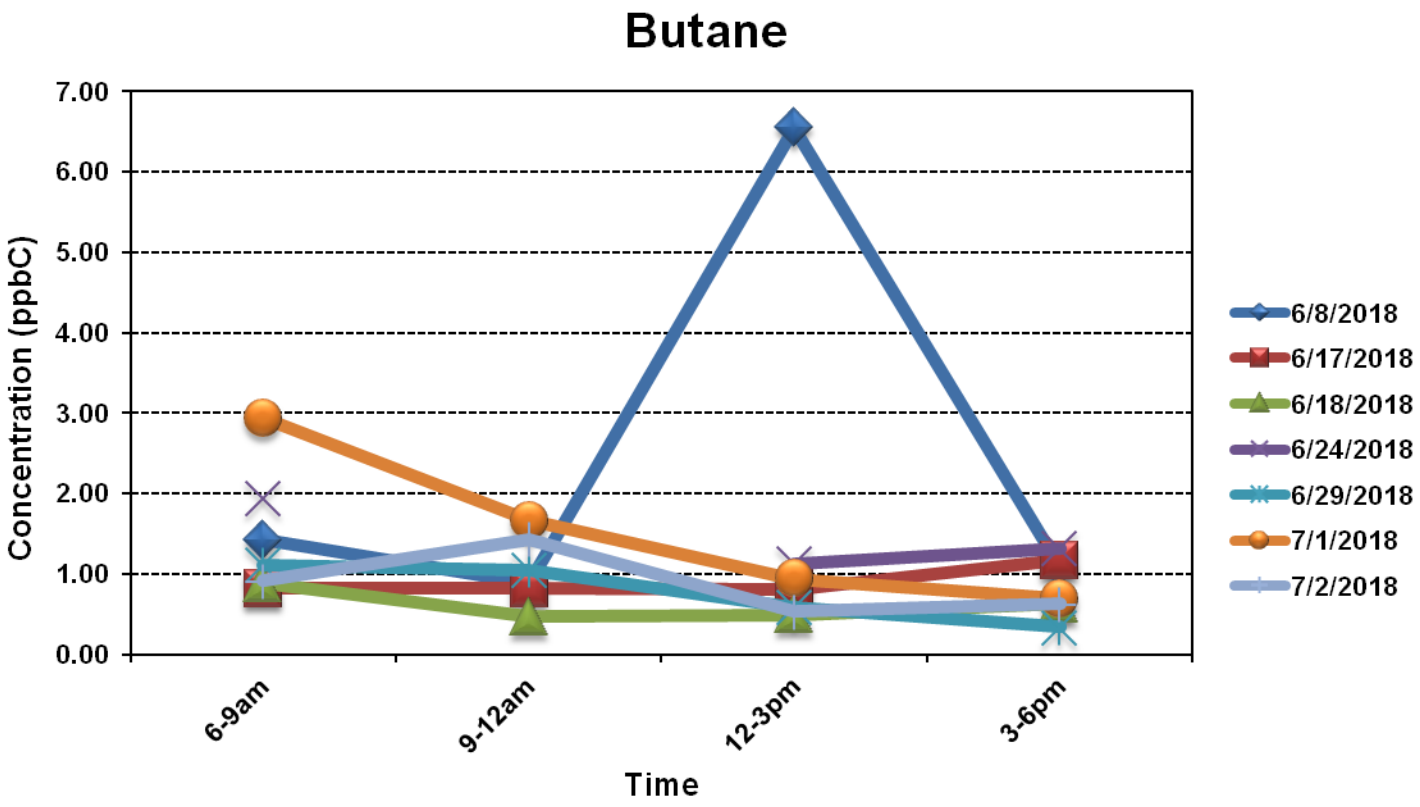


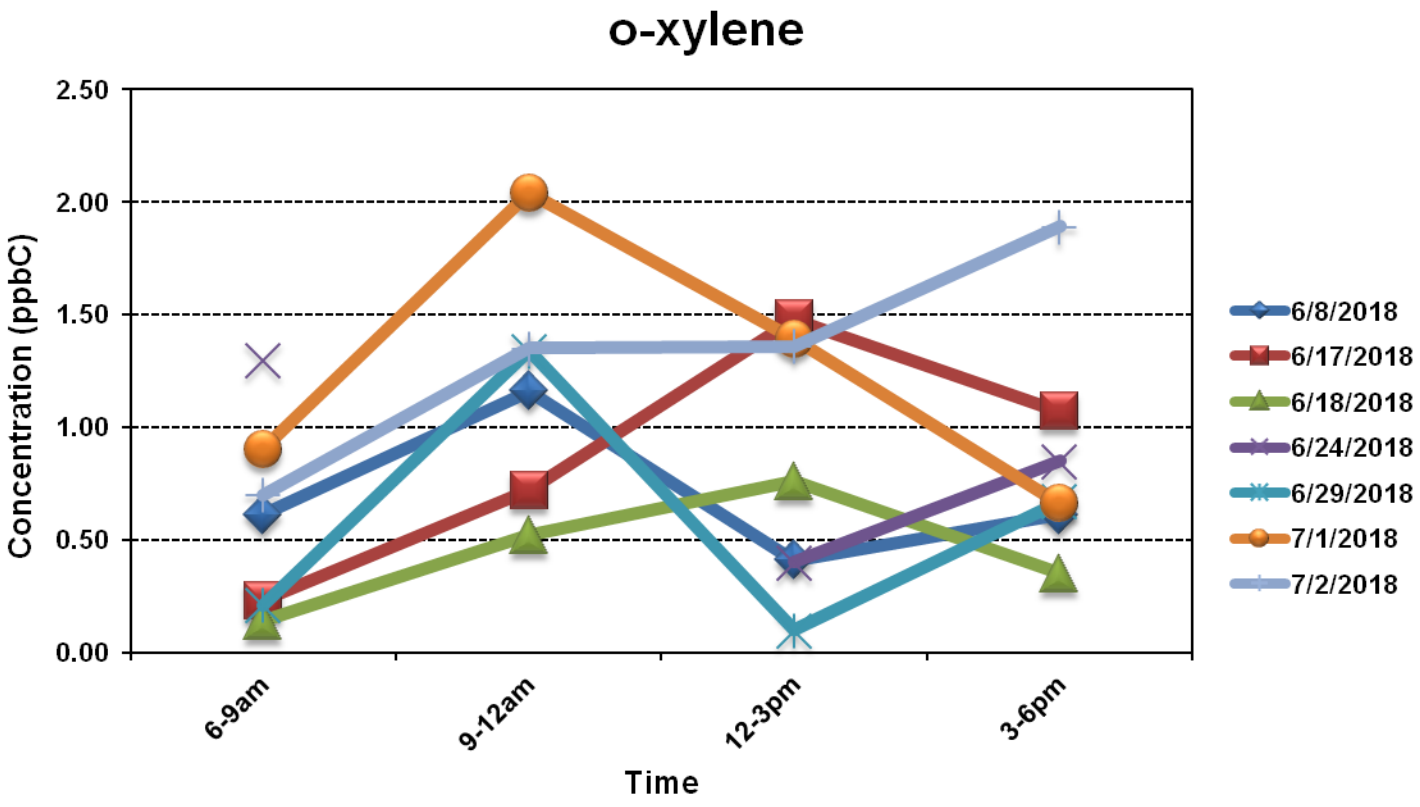
Propylene



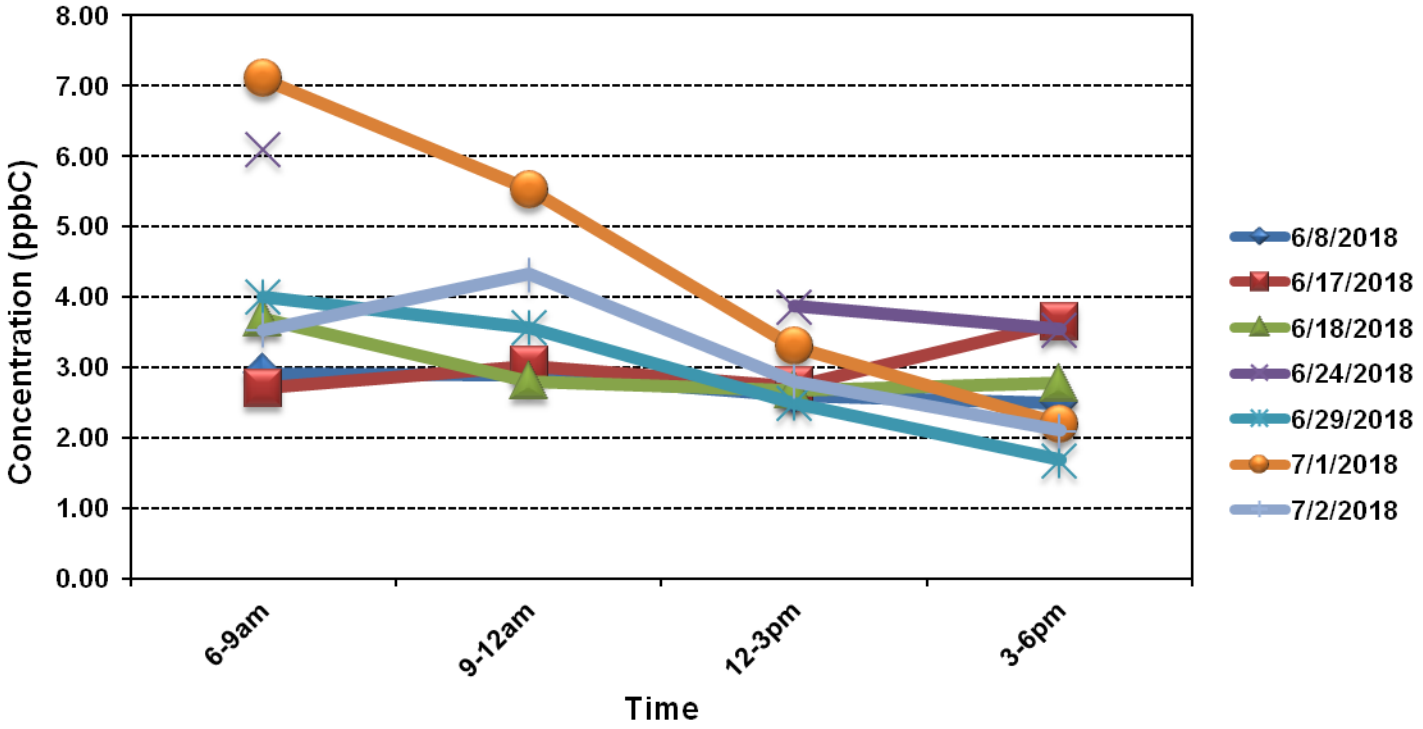
1,2,4 Trimethylbenzene



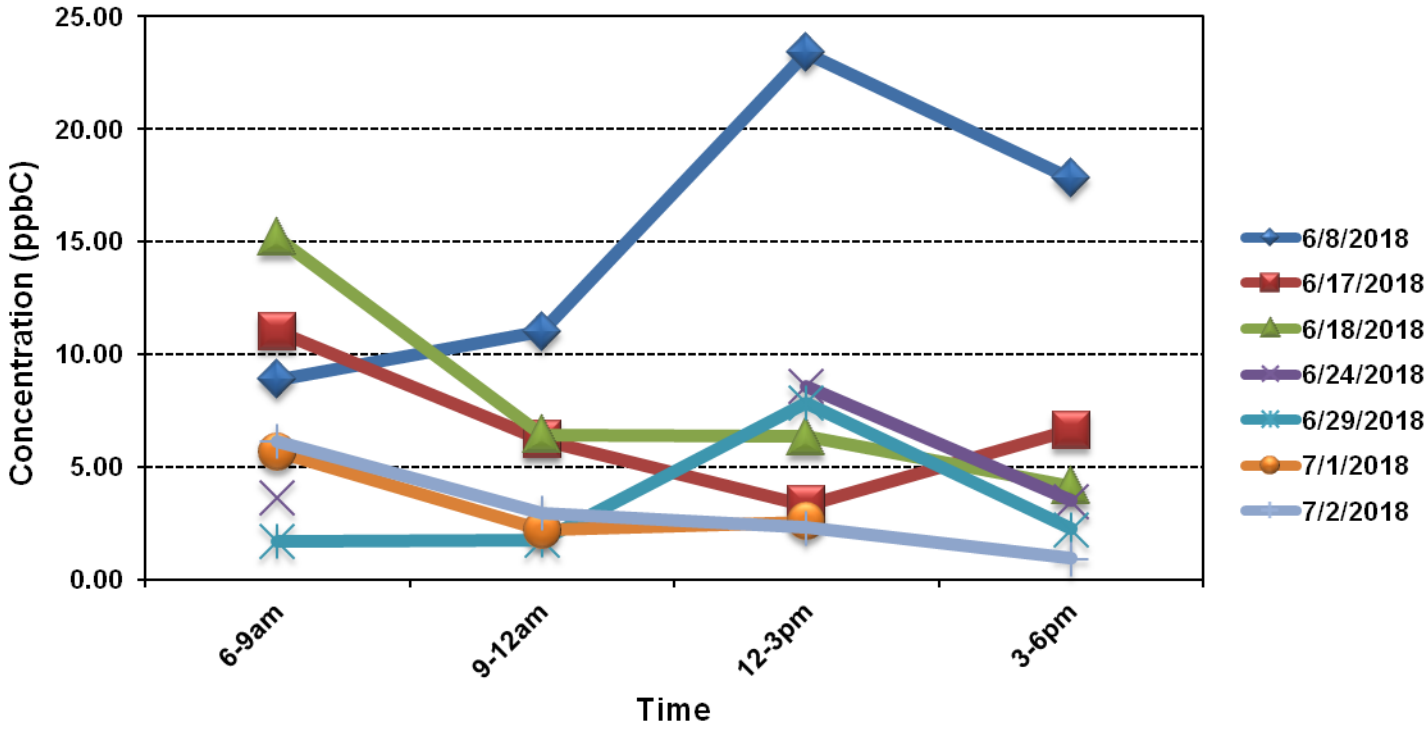

Butane
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Concentration (ppbC)
6-9am
9-12am
12-3pm
3-6pm
Time
6/8/2018
6/17/2018
6/18/2018
6/24/2018
6/29/2018
7/1/2018
7/2/2018


o-xylene
2.50
2.00
1.50
1.00
0.50
0.00
Concentration (ppbC)
6-9am
9-12am
12-3pm
3-6pm
Time
6/8/2018
6/17/2018
6/18/2018
6/24/2018
6/29/2018
7/1/2018
7/2/2018

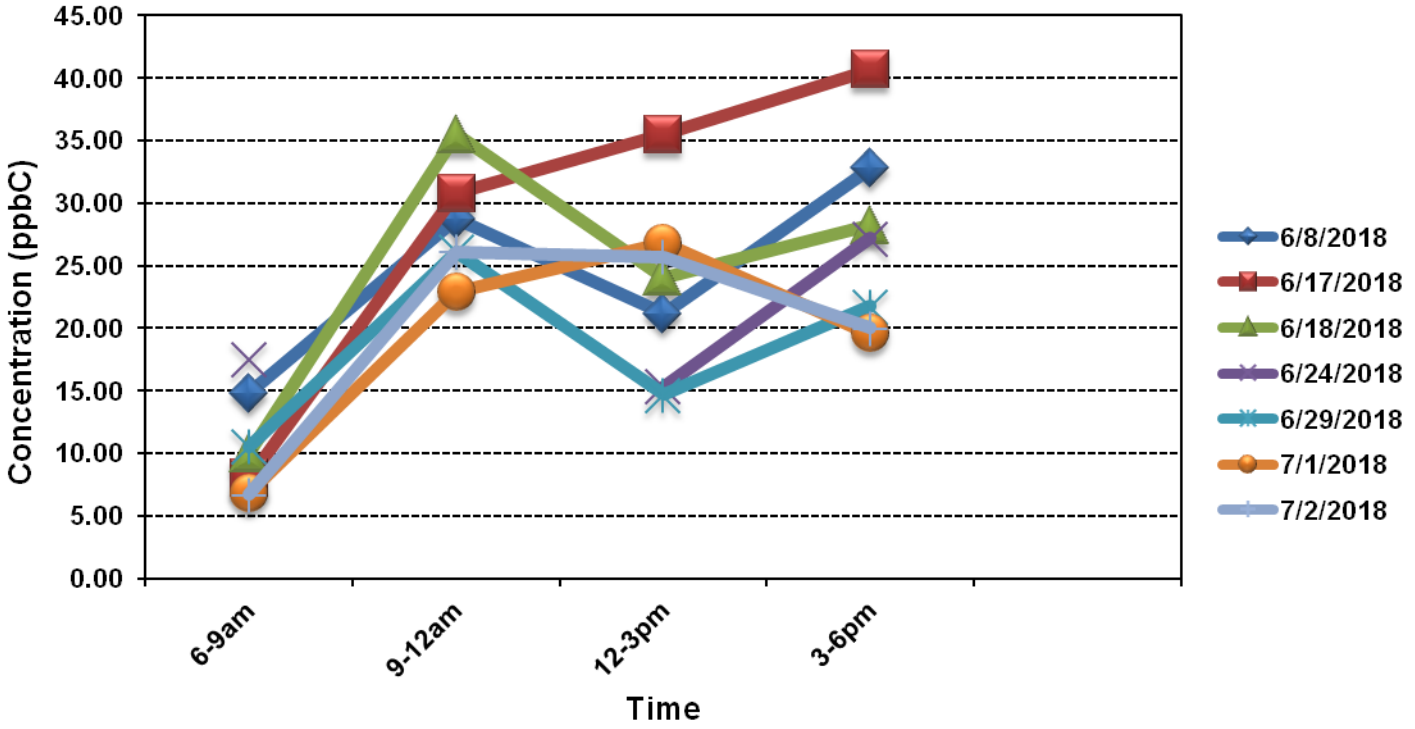
Propane



Pentane



Hexane



Isopentane